

AD-A092 023

FOREST PRODUCTS LAB MADISON WI
WOOD PRODUCTS USED IN CONSTRUCTING CONSERVATION AND DEVELOPMENT--ETC(U)
MAR 80 W H REID, D B MCKEEVER
FSRB-FPL-9

F/6 13/3

NL

UNCLASSIFIED

1 of 1
465 2218



United States
Department of
Agriculture
Forest Service
Forest
Products
Laboratory
Resource
Bulletin
FPL-9
March 1980

AD A 092023

DDC FILE COPY

LEVEL
12

Wood Products Used in Constructing Conservation and Development Projects by the Corps of Engineers in the United States — 1962 and 1978



Approved for
Distribution outside

ABSTRACT

Estimates of the amounts of wood products used in constructing civil conservation and development projects by the Corps of Engineers in the United States are presented for the years 1962 and 1978. Amounts of lumber, laminated lumber, poles and piling, and plywood used in construction are stratified by five construction categories, and three types of uses. Estimates of the amounts of wood products used in military construction in the United States is presented in a companion report.

HIGHLIGHTS

Expenditures by all Federal agencies for conservation and development projects tripled between 1962 and 1978, from \$1.3 to \$3.9 billion (table 1). In constant (1972) dollars expenditures increased by only 15 percent. Expenditures by the Corps of Engineers in 1962 were nearly \$0.9 billion, 65 percent of all Federal conservation and development expenditures (table 5). Expenditures dropped to just 47 percent of the Federal total in 1978. Expenditures in constant dollars dropped from \$1.3 billion in 1962 to \$1.0 billion in 1978.

An estimated 43.7 million board feet of lumber and 9.7 million square feet of plywood (3/8-inch basis) were used by the Corps of Engineers in constructing conservation and development projects in 1962 (table 6). Most of the lumber (92 pct) was for facilitating uses. In 1978, lumber consumption dropped to 20.4 million board feet, less than half the 1962 level. Plywood use increased to 11.8 million square feet. Facilitating remained the dominant use, although decreasing in proportion.

Between 1962 and 1978 lumber use per \$1,000 of construction expenditure decreased dramatically in terms of both current and constant (1972) dollars (table 7). Plywood use also decreased in use per current \$1,000 but showed an increase in constant dollar terms.

ACKNOWLEDGEMENT

Appreciation is expressed to personnel of the Corps of Engineers in Washington, D.C. and District offices for authorizing, during 1963 and 1978, Forest Service personnel to examine government records of the amounts of wood products required in constructing both civil and military projects.

Wood Products Used in Constructing Conservation and Development Projects by the Corps of Engineers in the United States — 1962 and 1978

By
10 WILLIAM H. REID, Research Forester

DAVID B. MCKEEVER, Research Forester

INTRODUCTION

This report presents estimates of the amounts of lumber, laminated lumber, poles and piling, and plywood used in constructing civil conservation and development projects by the Corps of Engineers in the United States during 1962 and 1978. The use of these materials is shown by category of nonmilitary construction (Public Use, Navigation, Erosion Control, Multiple Purpose Dam, and Flood Control), and by type of use (structural, millwork, and facilitating²).

Factors of wood use are shown per \$1,000 of construction value in both current and constant (1972) dollars. Constant dollars are used in order to provide a relatively uniform base for comparing 1962 and 1978 wood products use factors.

Construction expenditures for conservation and development projects in the United States, as reported by the Bureau of the Census are separated into (1) Federal and (2) State and local projects. Federal construction expenditures amount to about 80 percent of the total expenditures in conservation

and development projects (table 1). Expenditures for construction of Federal conservation and development projects between 1958 and 1978 increased at an average annual rate of 7.6 percent in current dollars and 2.6 percent in constant (1972) dollars (fig. 1).

The principal Federal agencies³ engaged in constructing conservation and development projects, based on percentages of construction expenditures, are:

11
12
15
Mar. 84

Maintained at Madison, Wis., in cooperation with the University of Wisconsin.

² Facilitating uses are temporary uses of wood products in construction for such things as shoring, scaffolding, and concrete forming.

³ Source: Construction Statistics Division, Bureau of Census, U.S. Dep. of Commerce, Washington, D.C.

Federal Agency	Year		
	1962	1966	1978
Corps of Engineers	65	63	47
Bureau of Reclamation	21	16	14
Tennessee Valley Authority	9	7	32
Forest Service	4	6	2
Bonneville Power Administration	—	—	3
All Other Agencies	1	8	2
Total	100	100	100

14
14
9 Forest Service
Resource Survey

141700 JM

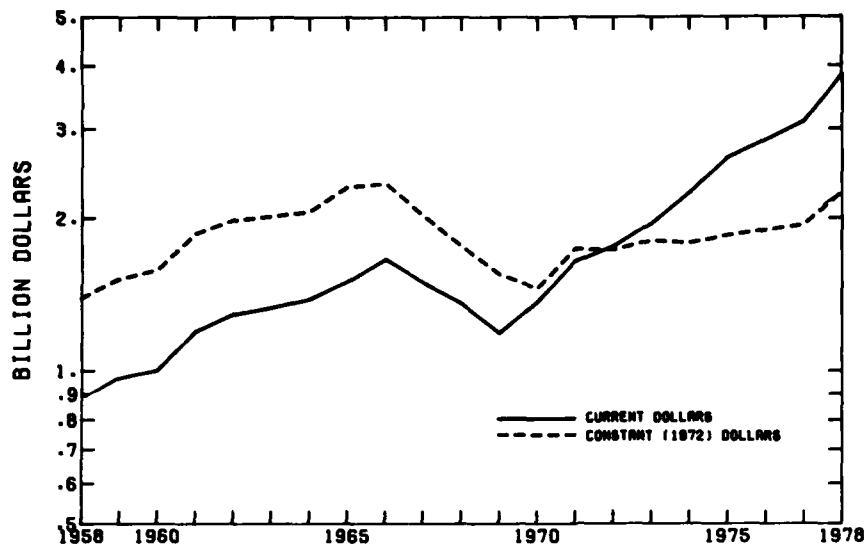


Figure 1.—Construction value of Federal conservation and development projects put in place in the United States, 1958 to 1978. M 148 864

Table 1.—Value of new construction for conservation and development projects put in place by type of agency in the United States, 1958-1978

Year	Million dollars			
	Total	Federal		Constant (1972)
		State and local	Current	
Year	Current	Current	Current	Constant (1972)
1958	1,019	134	885	1,392
1959	1,121	149	972	1,523
1960	1,175	170	1,005	1,586
1961	1,384	184	1,200	1,870
1962	1,523	226	1,297	1,989
1963	1,694	357	1,337	2,023
1964	1,750	360	1,390	2,070
1965	2,019	513	1,506	2,316
1966	2,194	529	1,665	2,349
1967	2,124	627	1,497	2,026
1968	1,973	610	1,363	1,768
1969	1,783	593	1,190	1,552
1970	1,908	541	1,367	1,455
1971	2,095	450	1,645	1,738
1972	2,172	410	1,762	1,733
1973	2,313	358	1,955	1,808
1974	2,741	495	2,246	1,788
1975	3,257	618	2,638	1,852
1976	3,751	894	2,857	1,897
1977	3,879	775	3,104	1,943
1978	4,435	584	3,851	2,253

Source: Data 1958-1972. Value of new construction put in place, 1947-1974, C30-74S U.S. Dep. of Commerce, Bureau of the Census, Dec. 1975, 185 p. Constant (1972) dollars converted from constant (1967) dollars using Bureau of the Census conversion factors.

Data 1973-1978. Construction Review, Volume 24, No. 8, Dec. 1978, U.S. Dep. of Commerce. Expenditures converted to constant (1972) dollars by Bureau of the Census, Construction Division, Washington, D.C.

This study is confined to the amounts and kinds of wood products used by the Corps of Engineers in constructing conservation and development projects in the United States.

PROCEDURE

Wood products use in constructing conservation and development projects by the Corps of Engineers in

1962 and 1978 was determined by surveying District Corps of Engineers' records of fair and reasonable costs and materials required to construct these projects. Projects selected were those recently completed or under construction at the time of survey and were selected at 15 District Corps of Engineers' offices. The 1962 sample consisted of 151 projects with a construction value of over \$675 million and the 1978 sample consisted of 218 projects with a construction value of about \$1,180 million (table 2). The projects were classified into 5 categories and 14 types of construction facilities.

Data collected from the Corps of Engineers' materials estimates included the amounts of wood products used in construction (i.e., lumber, laminated lumber, poles and piling, and plywood) and type of use (i.e., structural, millwork, and facilitating). In addition, the accepted bid price for each project was obtained. The bid price was increased by 12 percent to account for planning, engineering and architectural costs, and was designated construction value.

Wood products use per \$1,000 of construction value was determined by type of facility and use (table 3).

These wood use factors were weighted by the ratio of the construction value of each facility type to the construction value of the category (table 4). The value of construction by category (i.e., Public Use, Navigation, Erosion Control, Multiple Purpose Dams, and Flood Control) was determined for 1962 from the Corps of Engineers report, "Recently Essentially Completed Projects," and for 1978, the "Civil Works Budget Request for Fiscal 1978." These reports were used as indicators of activity by category of construction. Percentages of expenditures by category of construction for 1962 and 1978, developed from these reports, were applied to total construction value of conservation and development projects put in place by the Corps of Engineers to estimate value of construction by category (table 5, fig. 2).

Wood products use per \$1,000 of construction value in current dollars as determined for each category of construction and type of use was applied to current dollar value of construction put in place by category, to estimate the amounts of wood products used (table 6).

Wood products use per \$1,000 of construction value in constant (1972)

dollars is the ratio of wood products use as previously determined, to construction expenditures in constant dollars.

WOOD PRODUCTS USE

Expenditures in current dollars for constructing conservation and development projects by the Corps of Engineers increased from \$843 million in 1962 to \$1,810 million in 1978 (table 5)—an average annual increase of 4.9 percent. Expenditures in constant (1972) dollars for constructing these projects amounted to \$1,293 million in 1962 and \$1,059 million in 1978—a decrease of 1.2 percent per year.

Most of the lumber and plywood used in constructing conservation and development projects in the United States were for facilitating uses (table 6). Over 80 percent of the lumber and over 95 percent of the plywood was used for these purposes. Laminated lumber was used principally in the Public Use category of construction. During 1962, poles and piling were used principally in the Navigation category.

Lumber

During 1962, the lumber used in constructing conservation and development projects amounted to 43.7 million board feet (table 6, fig. 3). Two-thirds of this amount was used for facilitating purposes in constructing multiple-purpose dams that provide both hydraulic power and flood control. In 1978 total lumber use dropped to 20.4 million board feet, about one-half of the 1962 use. A high proportion, 80 percent, was used for facilitating purposes, distributed mainly in the Navigation, Multiple-Purpose Dam and Flood Control categories of construction (fig. 4). The total amounts of lumber used for structural and millwork purposes were fairly uniform during 1962 and 1978.

Total lumber use per \$1,000 of construction value between 1962 and 1978 increased at an annual rate of 9.1 percent in current dollars and 3.5 percent in constant (1972) dollars (table 7, fig. 5). A decrease in lumber use per \$1,000 (constant) occurred in all categories of construction, except Navigation, between the two study periods. The use of lumber in constant dollars, for structural purposes, increased from 2.7 board feet in 1962 to 3.8 board feet in 1978; however, during this period the use for

Table 2.—Number and construction value (current dollars) of sampled conservation and development projects constructed by the Corps of Engineers by category and type of facility, 1962 and 1978

Category and type of construction facility	1962		1978	
	Number of projects	Construction value (\$1,000)	Number of projects	Construction value (\$1,000)
Public use				
Recreation facilities	15	2,818.0	81	95,303.5
Docks and piers	6	1,677.4	4	2,071.6
Boat ramps	—	—	4	2,560.9
Treatment facilities (waste)	8	4,295.4	9	12,515.9
Total	29	8,790.8	98	112,451.9
Navigation				
Locks and dams	8	83,304.0	12	261,265.3
Dredging—navigation facilities, channel improvements	32	132,651.4	53	69,219.3
Total	40	215,955.4	65	330,484.6
Erosion control				
Walls	3	4,311.2	3	1,326.4
Breakwaters	8	9,868.9	5	30,113.0
Total	11	14,180.1	8	31,439.4
Multiple-purpose dams				
Dams (MP)	16	275,365.7	12	227,576.4
Powerhouses	4	46,452.2	4	374,932.5
Total	20	321,817.9	16	602,508.9
Flood control				
Levees	17	17,972.7	14	38,266.9
Pumping stations	11	6,962.6	3	5,284.7
Dams (FCR)	23	90,269.6	12	55,102.7
Articulated concrete mattress, rip-rap	—	—	2	4,158.6
Total	51	115,024.9	31	102,812.9
Total, all categories	151	675,769.1	218	1,179,697.7

facilitating purposes decreased from 31.1 board feet to 15.5 board feet (fig. 6).

Laminated Lumber

During 1962 a minor amount of laminated lumber was used in construction of conservation and development projects (table 6). During 1978 the use of laminated lumber amounted to 105,000 board feet. This was confined primarily to the Public Use category of construction.

During 1978 the use of laminated lumber amounted to 0.06 board feet per \$1,000 of construction value in current dollars and 0.10 board feet in constant dollars (table 7) for all categories. Usage in the Public Use category of construction was 3.24 board feet per \$1,000 of construction value.

Poles and Piling

The use of poles and piling in conservation and development projects amounted to 3.2 million linear feet or 20.2 million board feet⁴ during 1962 and 0.15 million linear feet or 1.0 million board feet during 1978 (table 6, fig. 3). Nearly all poles and piling use was for structural purposes (fig. 4). During 1962 the major portion of piling use, amounting to 3.0 million linear feet (18.9 million board feet), was in the Navigation category and was used primarily for bank stabilization and channel improvement. Poles and piling use per \$1,000 of construction value in current dollars amounted

⁴ Based on the conversion factor: 1 linear foot = 6.3 board feet, from Reid, William H., and David B. McKeever, "Wood products and other materials used in constructing highways in the United States," 1978, USDA For. Serv., For. Prod. Lab., Res. Bull. FPL-5, p. 3-4.

Table 3.—Wood products use per \$1,000 (current) of construction value by category, type of facility, and use for Corps of Engineers conservation and development projects in the United States, 1962 and 1978

Category and type of use	Lumber		Laminated lumber		Poles and piling		Plywood (3/8-inch)	
	1962	1978	1962	1978	1962	1978	1962	1978
	— Board feet —		— Board feet —		— Linear feet —		— Square feet —	
PUBLIC USE								
Recreation facilities								
Structural	40.38	18.85	0.07	2.23	7.24	0.28	2.84	3.66
Millwork	6.32	.36	—	—	—	—	—	.09
Facilitating	31.58	5.38	—	—	—	—	22.21	3.99
Total ¹	78.28	24.58	.07	2.23	7.24	.28	25.05	7.75
Docks and piers								
Structural	213.84	168.09	—	—	25.40	11.25	—	—
Millwork	—	—	—	—	—	—	—	—
Facilitating	42.03	1.26	—	—	—	—	10.91	1.21
Total ¹	255.87	169.34	—	—	25.40	11.25	10.91	1.21
Boat ramps								
Structural	—	3.75	—	—	—	.04	—	7.19
Millwork	—	—	—	—	—	—	—	—
Facilitating	—	1.64	—	—	—	—	—	2.30
Total ¹	—	5.39	—	—	—	.04	—	9.49
Treatment facilities (waste)								
Structural	1.19	2.14	—	—	.28	.02	—	1.52
Millwork	—	.12	—	—	—	—	—	—
Facilitating	64.60	3.08	—	—	—	—	27.15	2.45
Total ¹	66.02	5.35	—	—	.28	.02	27.15	3.97
NAVIGATION								
Locks and dams								
Structural	3.31	1.09	—	—	.03	.01	—	.05
Millwork	—	—	—	—	—	—	—	—
Facilitating	36.38	10.33	—	—	—	—	4.61	5.59
Total ¹	39.69	11.41	—	—	.03	.01	4.61	5.64
Dredging—navigation facilities, channel improvement								
Structural	10.96	1.73	—	.03	19.73	.84	—	.24
Millwork	—	—	—	—	—	—	—	—
Facilitating	2.16	4.14	—	—	—	—	.39	4.32
Total ¹	13.11	5.88	—	.03	19.73	.84	.39	4.56
EROSION CONTROL								
Walls								
Structural	0.46	0.30	—	—	—	7.69	—	—
Millwork	—	—	—	—	—	—	—	—
Facilitating	48.55	—	—	—	—	—	35.35	—
Total ¹	49.01	.30	—	—	—	7.69	35.35	—
Breakwaters								
Structural	7.61	.14	—	—	.25	—	—	—
Millwork	—	—	—	—	—	—	—	—
Facilitating	31.85	2.09	—	—	2.23	—	1.48	.87
Total ¹	39.46	2.22	—	—	2.48	—	1.48	.87

Table 3.—Wood products use per \$1,000 (current) of construction value by category, type of facility, and use for Corps of Engineers conservation and development projects in the United States, 1962 and 1978—cont.

Category and type of use	Lumber		Laminated lumber		Poles and piling		Plywood (3/8-inch)	
	1962	1978	1962	1978	1962	1978	1962	1978
	— Board feet —		— Board feet —		— Linear feet —		— Square feet —	
MULTIPLE-PURPOSE DAMS								
Dams (MP)								
Structural	2.05	0.34	—	—	0.33	—	0.03	0.06
Millwork	—	—	—	—	—	—	—	—
Facilitating	48.85	8.17	—	—	—	—	.08	15.09
Total ¹	50.90	8.51	—	—	.33	.09	15.12	5.15
Powerhouses								
Structural	.38	.99	—	—	.17	—	—	.51
Millwork	—	—	—	—	—	—	—	—
Facilitating	161.49	13.24	—	—	—	—	18.55	10.23
Total ¹	161.87	14.23	—	—	.17	—	18.55	10.75
FLOOD CONTROL								
Levees								
Structural	2.09	5.59	.02	—	.12	—	—	—
Millwork	.02	—	—	—	—	—	—	—
Facilitating	9.71	3.54	—	—	—	—	1.61	3.00
Total ¹	11.81	9.14	.02	—	.12	—	1.61	3.00
Pumping stations								
Structural	4.32	.04	—	—	.26	—	.17	—
Millwork	—	—	—	—	—	—	—	—
Facilitating	38.36	7.38	—	—	.01	—	11.35	3.14
Total ¹	42.69	7.42	—	—	.27	—	11.52	3.14
Dams (FCR)								
Structural	1.28	.98	—	—	.55	.06	—	.04
Millwork	.02	—	—	—	—	—	.01	—
Facilitating	56.07	11.77	—	—	—	—	17.17	8.24
Total ¹	57.37	12.76	—	—	.55	.06	17.17	8.27
Articulated concrete mattress, rip-rap								
Structural	—	—	—	—	—	—	—	—
Millwork	—	—	—	—	—	—	—	—
Facilitating	—	—	—	—	—	—	—	—
Total ¹	—	—	—	—	—	—	—	—

¹ Data may not add to total because of rounding.

to 3.84 linear feet during 1962 and 0.08 linear feet in 1978, and in constant dollars amounted to 2.5 linear feet during 1962 and 0.14 linear feet during 1978 (table 7). The data indicate a reduction of poles and piling use in constructing conservation and development projects in all categories of construction.

Plywood

Plywood use in 1962 amounted to 9.7 million square feet (3/8-in. basis) and increased to 11.8 million square

feet in 1978 (table 6, fig. 3). Practically all of the plywood used was for facilitating purposes (fig. 5). During 1962, the Multiple-Purpose Dams and Flood Control categories of construction accounted for 92 percent of the plywood used. However, during 1978, less than 80 percent of plywood used in construction was for these two categories; by including the navigation category, over 95 percent of the plywood used was accounted for by these three categories.

Plywood use per \$1,000 of con-

struction value in current dollars amounted to 11.5 square feet during 1962 and 6.5 square feet during 1978; however, plywood use in constant (1972) dollars amounted to 7.5 square feet during 1962 and 11.1 square feet during 1978 (table 7, fig. 6). Plywood use in constant dollars during 1978 increased over 1962 usage in Navigation, Multiple-Purpose Dams, and Flood Control categories of construction.

Table 4.—Weighting factors¹ to calculate sampled wood products used per \$1,000 (current) of construction value for conservation and development projects constructed by the Corps of Engineers in the United States, 1962 and 1978

Category and type of construction facility	1962	1978
Public use		
Recreational facilities	0.32	0.85
Docks and piers	.19	.02
Boat ramps	—	.02
Treatment facilities (waste)	.49	.11
	1.00	1.00
Navigation		
Locks and dams	.39	.79
Dredging—navigation facilities, channel improvements	.61	.21
	1.00	1.00
Erosion control		
Walls	.30	.04
Breakwater	.70	.96
	1.00	1.00
Multiple-purpose dams		
Dams (MP)	.86	.38
Powerhouses	.14	.62
	1.00	1.00
Flood control		
Levees	.15	.37
Pumping stations	.06	.05
Dams (FCR)	.79	.54
Articulated concrete mattress, rip-rap	—	.04
	1.00	1.00

¹ Weighting factor by type of construction facility = value of construction for type of facility / value of construction for category.

Table 5.—Value in current and constant (1972) dollars of new conservation and development construction put in place by the Corps of Engineers in the United States, 1962 and 1978²

Construction category	Million dollars			
	Current	Constant (1972)		
	1962	1978	1962	1978
Public use	8.4	54.3	12.9	31.8
Navigation	244.5	380.1	375.0	222.4
Erosion control	8.4	36.2	12.9	21.2
Multiple-purpose dams	455.2	561.1	698.2	328.3
Flood control	126.4	778.3	193.2	455.4
Total²	843.0	1,810.0	1,293.0	1,059.0

¹ Note: The value of construction put in place in conservation and development projects by the Corps of Engineers during 1962 was 65 pct of the total Federal expenditures in these types of projects and 47 pct during 1978 (table 1).

² Data may not add to totals because of rounding.

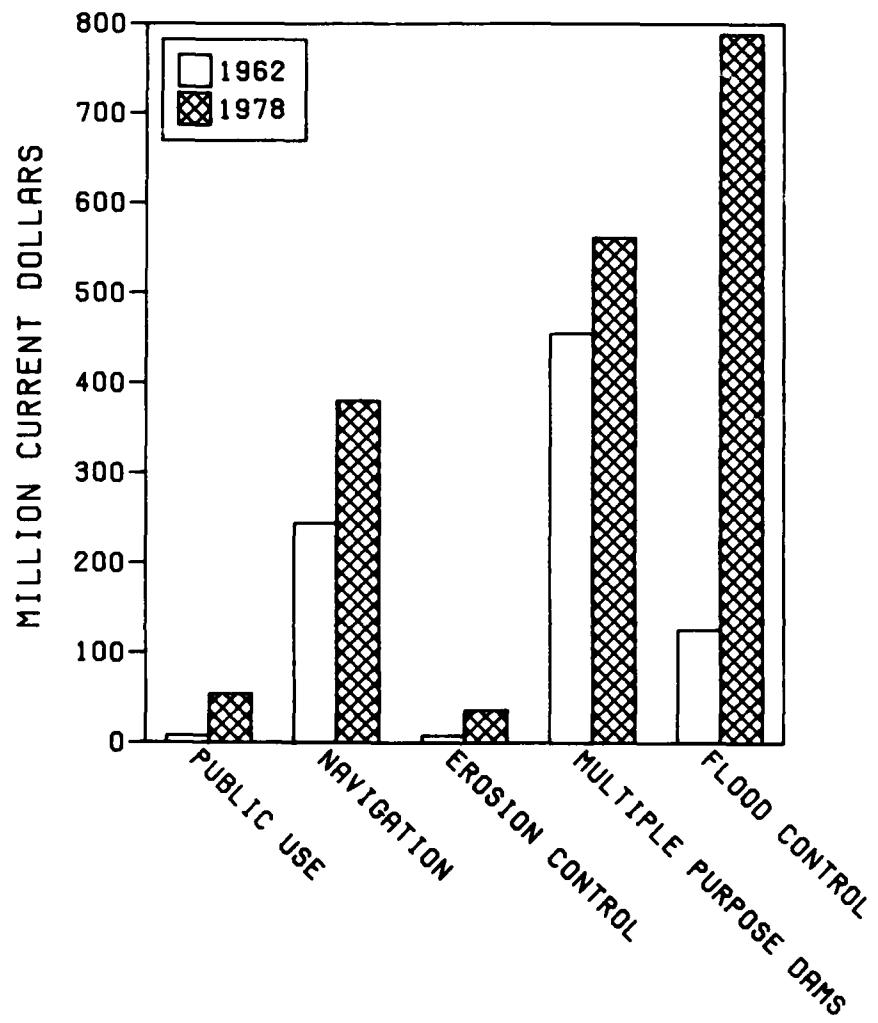


Figure 2.—Construction value in current dollars of conservation and development projects put in place by the Corps of Engineers in the United States by category, 1962 and 1978. M 148 865

Accession No.	
NTIS STAN	
DTIC T-1	
Universal	
100-100000	
<i>Not on file</i>	
By _____	
Distr. _____	
Availability Codes	
- - - - -	
Dist.	Local
<i>PA</i>	

Table 6.—Wood products used in constructing conservation and development projects by Corps of Engineers by construction category and type of use in the United States, 1962 and 1978

Category and type of use	Lumber		Laminated lumber		Poles and piling		Plywood (3/8-inch)	
	1962	1978	1962	1978	1962	1978	1962	1978
	— 1,000 Board feet —		— 1,000 Board feet —		— 1,000 Linear feet —		— 1,000 Square feet —	
Public use								
Structural	458.0	1,053.2	0.2	102.9	61.6	24.1	7.7	186.6
Millwork	18.0	17.2	—	—	—	—	—	4.2
Facilitating	419.1	269.3	—	—	—	—	189.4	202.7
Total¹	895.1	1,339.7	.2	102.9	61.6	24.1	197.1	393.4
Navigation								
Structural	1,957.3	464.3	—	2.4	2,965.7	69.9	.2	35.2
Millwork	—	.3	—	—	—	—	—	1
Facilitating	3,754.9	3,432.6	—	—	—	—	493.6	2,023.8
Total¹	5,712.2	3,897.2	—	2.4	2,965.7	69.9	493.8	2,059.1
Erosion control								
Structural	45.8	5.3	—	—	1.5	11.7	—	—
Millwork	—	—	—	—	—	—	—	—
Facilitating	311.3	72.3	—	—	13.1	—	99.3	30.1
Total¹	357.1	77.6	—	—	14.6	11.7	99.3	30.1
Multiple-purpose dams								
Structural	822.7	418.6	—	—	138.6	.9	12.2	191.4
Millwork	.3	—	—	—	—	—	—	—
Facilitating	29,640.3	6,353.3	—	—	—	17.8	7,095.8	4,653.8
Total¹	30,463.2	6,771.9	—	—	138.6	18.7	7,108.1	4,845.1
Flood control								
Structural	200.5	2,032.6	.3	—	58.4	25.7	1.5	15.1
Millwork	2.9	.8	—	—	—	—	.5	—
Facilitating	6,047.9	6,232.4	—	—	.1	—	1,821.7	4,430.0
Total¹	6,251.3	8,265.8	.3	—	58.5	25.7	1,823.8	4,445.1
Total, all categories								
Structural	3,484.3	3,974.0	.5	105.3	3,225.8	132.4	21.6	428.3
Millwork	21.2	18.3	—	—	—	—	.7	4.3
Facilitating	40,173.4	16,359.9	—	—	13.2	17.8	9,699.8	11,340.2
Total¹	43,678.9	20,352.2	.5	105.3	3,239.0	150.3	9,722.1	11,772.8

¹ Data may not add to totals because of rounding.

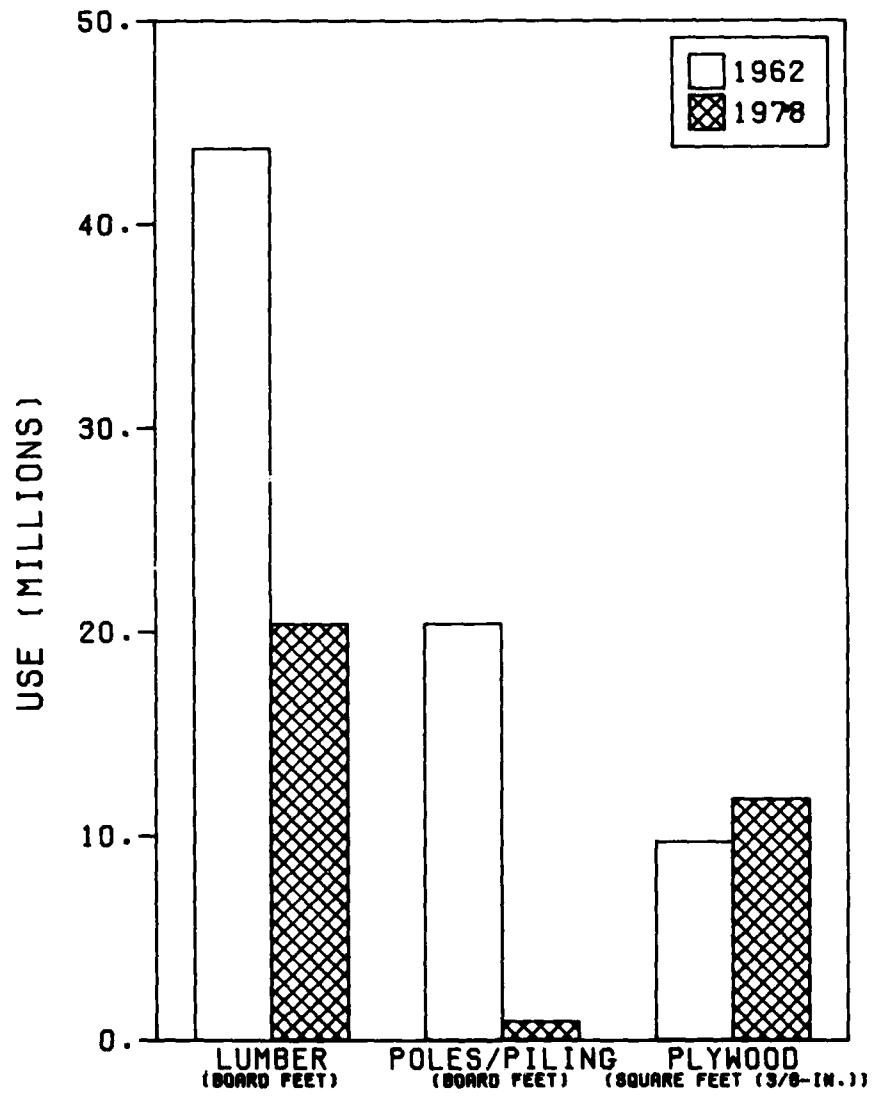


Figure 3.—Lumber, poles and piling, and plywood used in constructing conservation and development projects by the Corps of Engineers in the United States, 1962 and 1978. M 148 868

Table 7.—Wood products use per \$1,000 of construction value in current and constant (1972) dollars in constructing conservation and development projects by the Corps of Engineers in the United States, 1962 and 1978

Category and type of use	Lumber			Laminated lumber			Poles and piling			Plywood (3/8-inch)		
	Current dollars	Constant dollars	Current dollars	Constant dollars	Current dollars	Constant dollars	Current dollars	Constant dollars	Current dollars	Constant dollars	Current dollars	Constant dollars
	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978	1962	1978
<u>Board feet</u>												
<u>Public use</u>												
Structural	54.33	19.40	35.42	33.15	0.02	1.89	0.01	3.24	7.30	0.44	4.76	0.76
Millwork	2.14	.32	1.39	.54	—	—	—	—	—	—	—	.08
Facilitating	49.71	4.96	32.41	8.48	—	—	—	—	—	—	—	14.65
Total ¹	106.18	24.67	69.23	42.17	.02	1.89	.01	3.24	7.30	.44	4.76	.76
<u>Navigation</u>												
Structural	8.01	1.22	5.22	2.09	—	.01	—	.01	12.13	.18	7.91	.31
Millwork	—	—	—	—	—	—	—	—	—	—	—	—
Facilitating	15.36	9.03	10.01	15.43	—	—	—	—	—	—	—	—
Total ¹	23.37	10.25	15.23	17.52	—	.01	—	.01	12.13	.18	7.91	.31
<u>Erosion control</u>												
Structural	5.44	.15	3.54	.25	—	—	—	—	.18	.32	.11	.55
Millwork	—	—	—	—	—	—	—	—	—	—	—	—
Facilitating	36.92	2.00	24.07	3.41	—	—	—	—	—	—	—	—
Total ¹	42.36	2.14	27.62	3.66	—	—	—	—	—	—	—	—
<u>Multiple-purpose dams</u>												
Structural	1.81	.75	1.18	1.28	—	—	—	—	.30	—	.20	.03
Millwork	—	—	—	—	—	—	—	—	—	—	—	—
Facilitating	65.11	11.32	42.45	19.35	—	—	—	—	.30	.03	.20	.06
Total ¹	66.92	12.07	43.63	20.63	—	—	—	—	—	—	—	14.76
<u>Flood control</u>												
Structural	1.59	2.61	1.03	4.46	—	—	—	—	.46	.03	.30	.06
Millwork	.02	—	.01	—	—	—	—	—	—	—	.01	.03
Facilitating	47.83	8.01	31.18	13.69	—	—	—	—	—	—	—	—
Total ¹	49.44	10.62	32.23	18.15	—	—	—	—	.46	.03	.30	.06
<u>Weighted average, all categories</u>												
Structural	4.13	2.20	2.69	3.75	—	.06	—	.10	3.83	.07	2.49	.13
Millwork	.03	.01	.02	.02	—	—	—	—	—	—	—	.02
Facilitating	47.66	9.04	31.07	15.45	—	—	—	—	.02	.01	.02	11.51
Total ¹	51.81	11.24	33.78	19.22	—	.06	—	.10	3.84	.08	2.50	.14

¹ Data may not add to totals because of rounding.

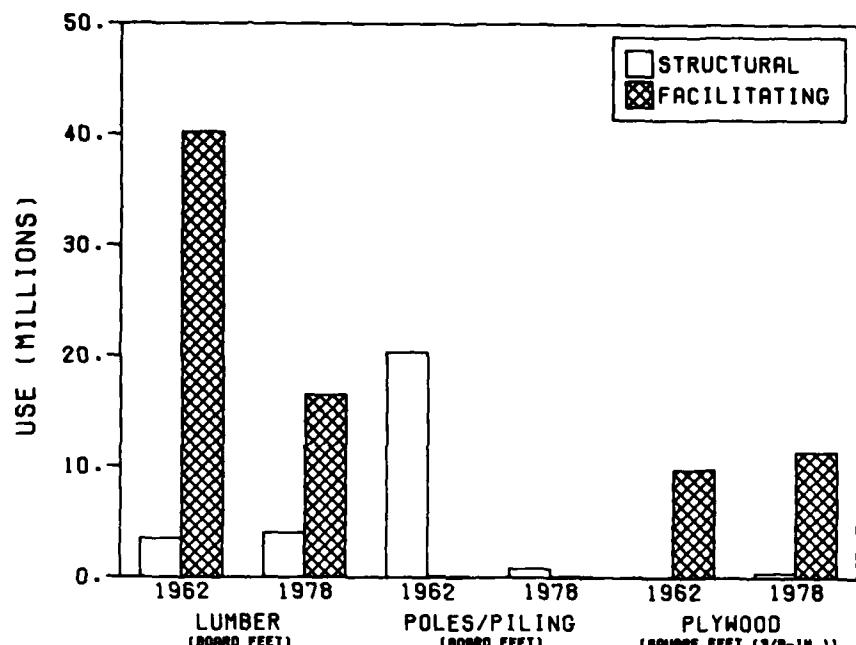


Figure 4.—Lumber, poles and piling, and plywood used in constructing conservation and development projects by the Corps of Engineers in the United States by type of use, 1962 and 1978. M 148 866

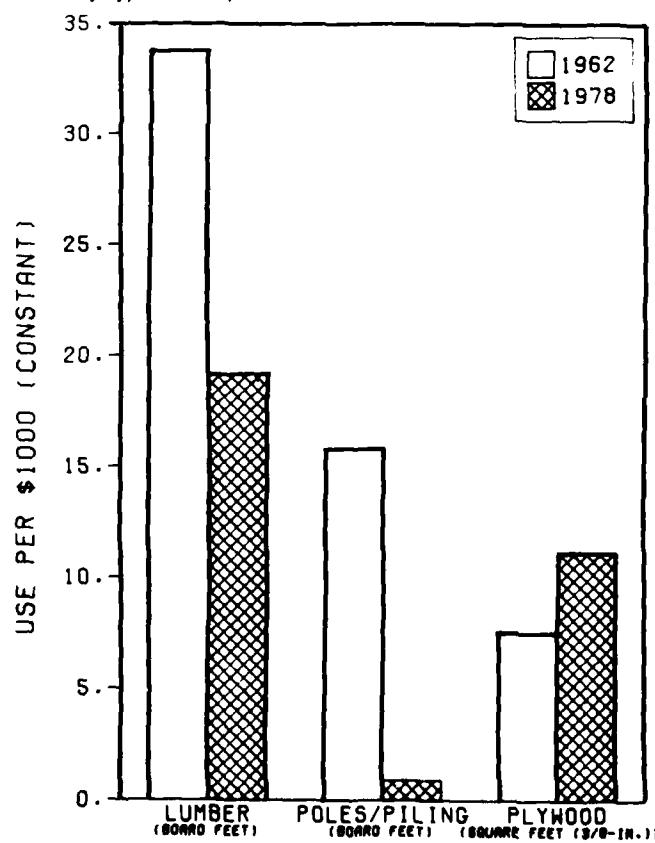


Figure 5.—Lumber, poles and piling, and plywood use per \$1,000 (constant) of construction value in conservation and development projects by the Corps of Engineers in the United States, 1962 and 1978. M 148 869

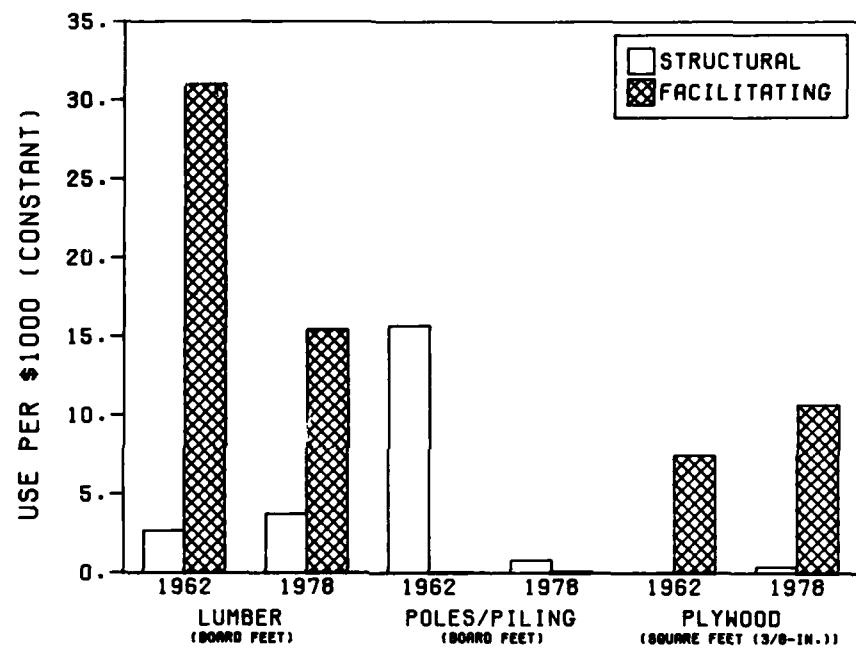


Figure 6.—Lumber, poles and piling, and plywood use per \$1,000 (constant) of construction value in conservation and development projects by the Corps of Engineers in the United States by type of use, 1962 and 1978. M 148 887

2.5-13-7/80

U.S. Forest Products Laboratory.

Wood products used in constructing conservation and development projects by the Corps of Engineers in the United States--1962 and 1978, by William H. Reid and David B. McKeever, Madison, Wis., FPL 1980 13 p. (USDA For. Serv. Resour. Bull. FPL 9).

The estimates in current and constant (1972) dollar values and quantities for wood and wood products (lumber, poles and piling, plywood, and laminated lumber) used in nonmilitary construction are presented for types of use and construction category (public use, navigation, erosion control, multiple purpose dam, and flood control).

U.S. Forest Products Laboratory.

Wood products used in constructing conservation and development projects by the Corps of Engineers in the United States--1962 and 1978, by William H. Reid and David B. McKeever, Madison, Wis., FPL 1980 13 p. (USDA For. Serv. Resour. Bull. FPL 9).

The estimates in current and constant (1972) dollar values and quantities for wood and wood products (lumber, poles and piling, plywood, and laminated lumber) used in nonmilitary construction are presented for types of use and construction category (public use, navigation, erosion control, multiple purpose dam, and flood control).

U.S. Forest Products Laboratory.

Wood products used in constructing conservation and development projects by the Corps of Engineers in the United States--1962 and 1978, by William H. Reid and David B. McKeever, Madison, Wis., FPL 1980 13 p. (USDA For. Serv. Resour. Bull. FPL 9).

The estimates in current and constant (1972) dollar values and quantities for wood and wood products (lumber, poles and piling, plywood, and laminated lumber) used in nonmilitary construction are presented for types of use and construction category (public use, navigation, erosion control, multiple purpose dam, and flood control).

U.S. Forest Products Laboratory.

Wood products used in constructing conservation and development projects by the Corps of Engineers in the United States--1962 and 1978, by William H. Reid and David B. McKeever, Madison, Wis., FPL 1980 13 p. (USDA For. Serv. Resour. Bull. FPL 9).

The estimates in current and constant (1972) dollar values and quantities for wood and wood products (lumber, poles and piling, plywood, and laminated lumber) used in nonmilitary construction are presented for types of use and construction category (public use, navigation, erosion control, multiple purpose dam, and flood control).